Columbia Weather Systems

Weather Station
10200-DECK2-B
with Hukseflux Solar Radiation Sensors

For Sunlight General Installations

User Manual

Version 1.02

Serial Number: _____

Date Purchased: _____

All specifications subject to change without notice.

Printed in U. S. A.

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Important Notice: Shipping Damage

BEFORE YOU READ ANY FURTHER, please inspect all system components for obvious shipping damage. The weather station is a high precision instrument and can be damaged by rough handling. Your unit was packaged to minimize the possibility of damage in transit. Please save the shipping container for any future shipment of your weather station.

In the event your order arrives in damaged condition, it is important that the following steps be taken immediately. The title transfers automatically to you, the customer, once the material is entrusted to the transport company.

NOTE: DO NOT RETURN THE INSTRUMENT TO COLUMBIA WEATHER SYSTEMS until the following steps are completed. Failure to follow this request will jeopardize your claim.

1. Open the container and inspect the contents. Do not throw away the container or any damaged parts. Try to keep items in the same condition as originally received.
2. Notify the transport company immediately.
3. Request the transport company's representative inspect the shipment personally.
4. After inspection, request a Return Materials Authorization (RMA) from Columbia Weather Systems by calling (503) 629-0887.
5. Return approved items to us at the following address:

   Columbia Weather Systems, Inc.

   2240 NE Griffin Oaks Street, Suite 100

   Hillsboro, OR 97124
6. After a repair evaluation, an estimate of the cost of repair will be sent to you.

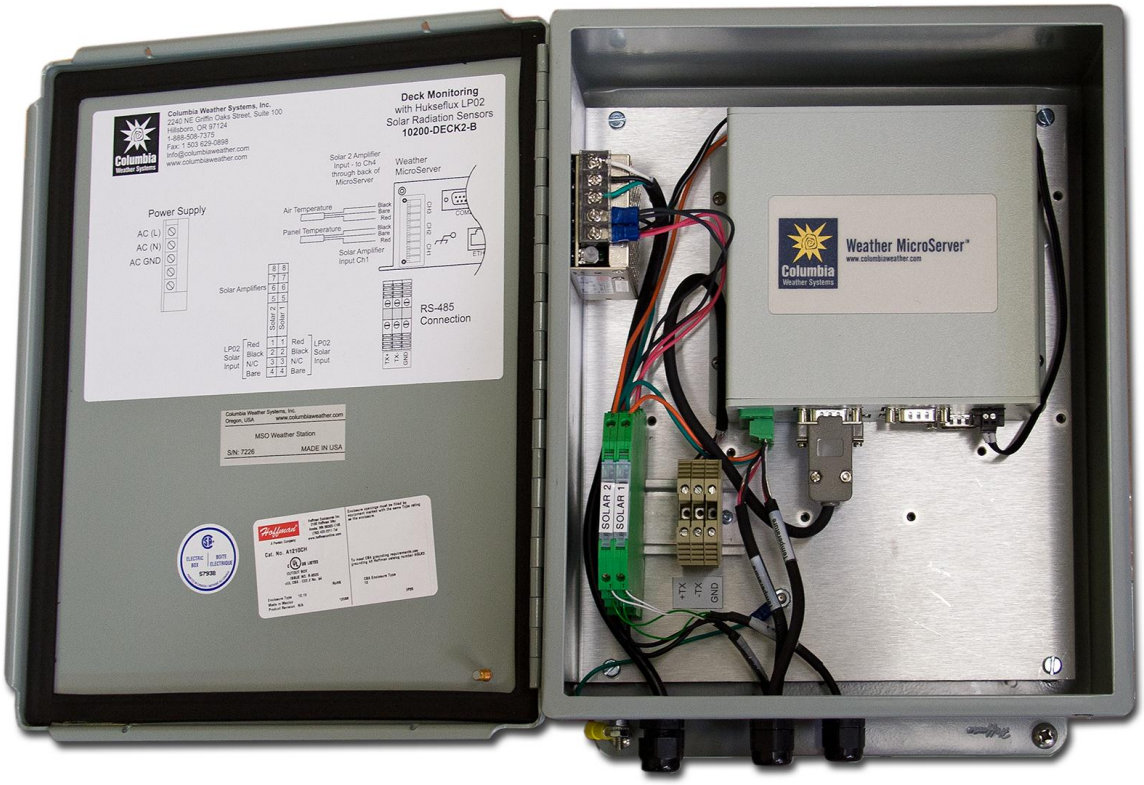
ESD Protection

Electrostatic Discharge (ESD) can cause immediate or latent damage to electronic circuits. The Weather Station is adequately protected against ESD for its intended use. However, it is possible to damage the product by delivering electrostatic discharges when touching, removing, or inserting any objects inside the equipment housing.

To avoid delivering high static voltages yourself:

1. Handle ESD sensitive components on a properly grounded and protected ESD workbench. When this is not possible, ground yourself with a wrist strap and a resistive connection cord to the equipment chassis before touching the boards. When neither of the above is possible, at least touch a conductive part of the equipment chassis with your other hand before touching the boards.
2. Always hold the boards by the edges and avoid touching the component contacts.

System Enclosure:



The system enclosure includes the following:

- AC power supply with 24VDC output
- Weather MicroServer
- RS-485 Terminal Strip
- Two solar amplifiers

The system enclosure is weatherproof and includes hardware to mount the unit on a mast.

Weather MicroServer

The Weather MicroServer uses a small computer board that runs an embedded Linux operating system.

The MicroServer has 2GB flash memory for data logging and operation.

The MicroServer has two RS-232 COM ports and an Ethernet port

The MicroServer offers the following:

- XML Weather Data
- FTP weather data in XML or CSV format
- Modbus/TCP, Modbus RTU (Serial RS-232), and Modbus ASCI interfaces
- SNMP interface
- Weather Underground interface
- CWOP interface
- Three months of data logging at 1-minute interval
- Interface to optional visibility and solar radiation sensors

MicroServer Configuration

The MicroServer is set to a default IP address of 192.168.0.50.

To connect to the MicroServer using a computer, set the computer to a static IP address of 192.168.0.49.

Use an Internet browser to connect to the MicroServer over its IP address.

Log in information:

User name: admin

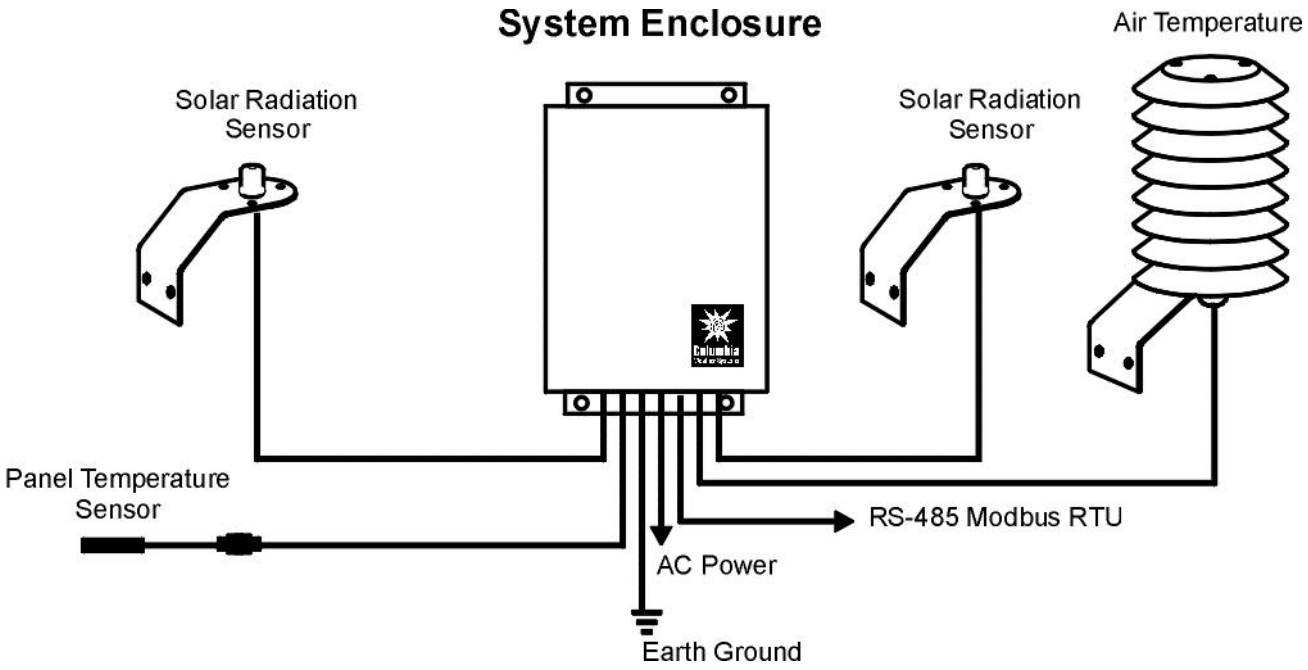
Password: admin

Installation

Installation Overview

- Installing the 10-foot Tripod
- Install the weatherproof enclosure to tripod
- Installing the air temperature sensor with radiation shield
- Installing the panel temperature sensor
- Installing the solar radiation sensors
- Connecting sensors to the MicroServer
- Connecting to MicroServer to RS-485

System Diagram



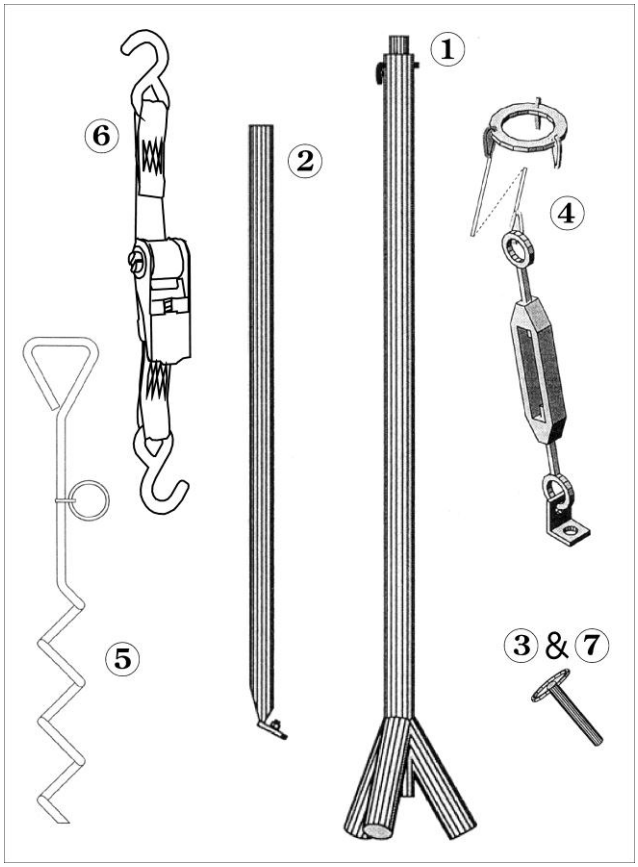
Tripod and Tiedown Kit

The meteorological tripod is designed to provide up to 10 feet of stable, secure support for your meteorological sensors.

Constructed from welded aluminum and clear anodized for appearance and longevity, the 15-pound tripod can easily support up to 60 pounds of equipment. An optional tie-down kit allows for additional security in high-wind areas.

To install, insert the legs into the main body and secure with stainless steel retainer pins. Extend the mast to the desired height and insert another retainer pin. Install the guy wires to complete the set-up.

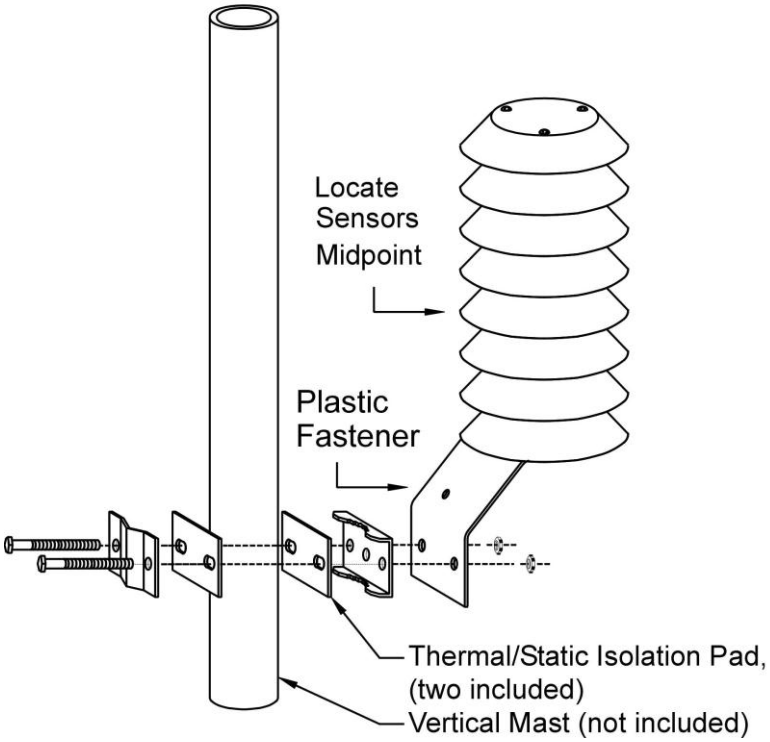
Tripod Parts List:



Item #	Description	Qty
1	Body/Mast Assembly	1
2	Legs	3
3	Retainer Pins	4
4	Guy Wire Ring with 3 Wires and Turnbuckles	1
5	**Anchor Screw with Chain**	**Not included in this configuration**
6	Clamp with Strap	1
7	Retainer Pin	1

Installing the Air (Ambient) Temperature Sensor

The air temperature sensor is installed in the self-aspirating radiation shield.



The temperature radiation shield should be mounted on the pole facing the north.

Installing the panel temperature sensor

The panel temperature sensor can be attached to the solar panel using a 5-minute epoxy.

Use tie wraps to secure the cable to the panel frame.

Installing the solar radiation sensor

The solar radiation sensor can be installed on the mast using the hardware included to provide solar radiation measurement.

Two types of brackets are provided: one for global radiation measurement, and the second for POA radiation measurement.

Plane of Array Solar Radiation:

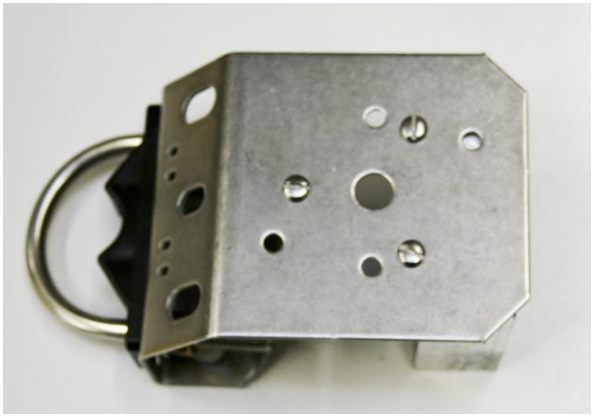
Install the solar sensor on the POA bracket using the provided screws, washers, and nuts. Use the two holes marked in the photo below:

Install the bracket on the pole using the two sets of u-bots:

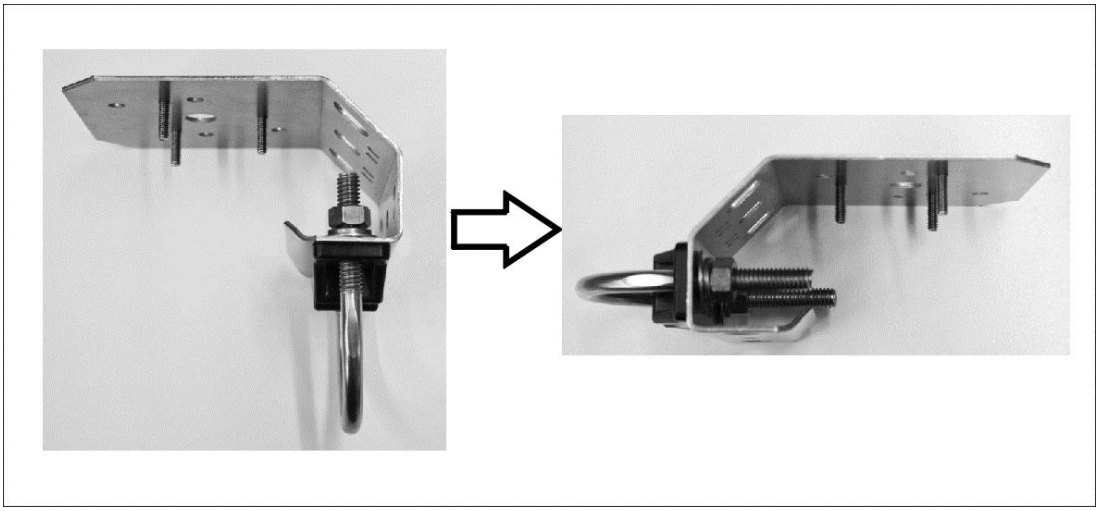
The POA solar sensor should be facing the south in order for the pole not to shadow the sensors.

Global Solar Radiation:

Remove the three top screws and discard.

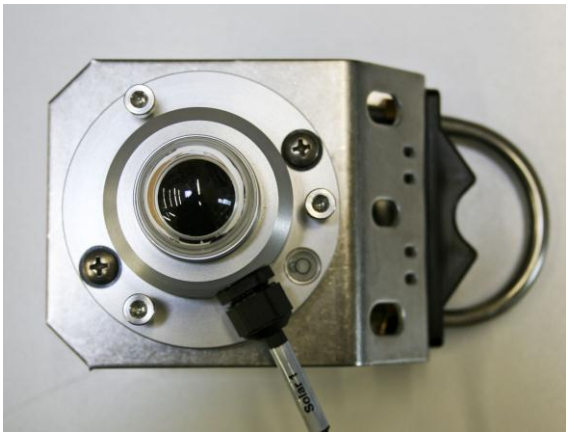


Change the position of the U-bracket to allow for mounting on a vertical pole



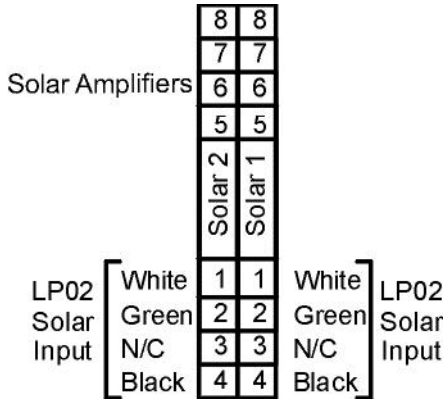
Install the sensor on the bracket using the provided screws, washers, and nuts and mount the bracket on the pole

Make sure the sensor is level. If not, loosen the mounting screws and adjust the leveling screws to achieve level installation.



Note:

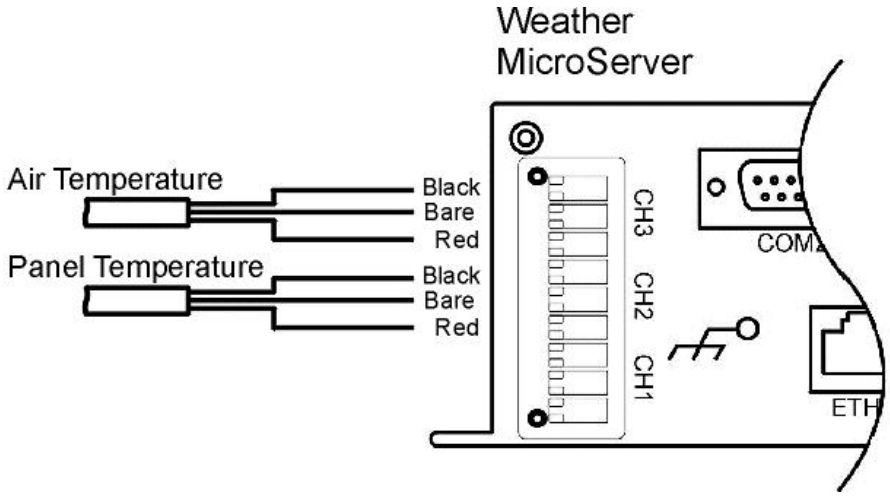
Each Hukseflux LP02 solar radiation sensor comes with a unique sensitivity value. Therefore it is important that the sensors are connected to the correct solar input (Solar 1 or Solar 2).



Each Hukseflux LP02 solar radiation sensor comes with a unique sensitivity value. Therefore it is important that the sensors are connected to the correct solar input (Solar 1 or Solar 2).

If the solar sensor is replaced in the future, then the sensitivity/factor needs to be entered in the MicroServer interface.

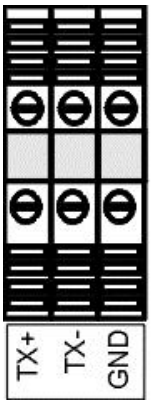
Connecting sensors to the MicroServer



Connect the panel temperature sensor to Channel 2.

Connect the air temperature sensor to Channel 3.

Connecting to MicroServer to RS-485



RS-485
Connection

The Modbus RTU is set to 9600 baud rate, none parity with a Modbus address of 51.

Modbus Registers

Weather MicroServer with Modbus TCP/IP Slave Interface or Modbus/RTU over COM2 (RS-485)

32-Bit Registers

All data accessed via (read only) input registers [Modbus function code 3]

Data type Long = Signed 32 bit value

Data type Float = 32 bit floating point value

Measurement	Description	Starting Modbus Offset	Columbia data type	Modbus Address	OPC data type
umtLastMeasTime	Time of last measurement	1	posix time	30001	Long
umtTemp2	Panel/Cell Temperature	253	float	30253	Float
	Panel/Cell Temperature time stamp	255	posix time	30255	Long
umtTemp3	Air (Ambient) Temperature	257	float	30257	Float
	Air (Ambient) time stamp	259	posix time	30259	Long
umtSolarRadiation	Solar Radiation 1	265	float	30265	Float
	Solar Radiation 1 time stamp	267	posix time	30267	Long
umtSolarRadiation_2	Solar Radiation 2	269	float	30269	Float
	Solar Radiation 2 time stamp	271	posix time	30271	Long

Notes:

For each of the available measurements, the two registers immediately following the value contain the posix time value of the time that value was last updated. For example: Panel/Cell temperature value is stored in registers 253 and 254. The last update timestamp is stored in registers 255 and 256 and is a 32-bit integer value.

The posix time values are 32-bit integers; all the values are Modbus input registers.

USER SUPPORT INFORMATION

This section consists of the following items:

1. One-Year Limited Warranty: Please read this document carefully.
2. Return for Repair Procedure: This procedure is for your convenience in the event you must return your Weather Station for repair or replacement. Follow the packing instructions carefully to protect your instrument in transit.

Limited Warranty

Columbia Weather Systems, Inc. (CWS), warrants the Weather Station to be free from defects in materials and/or workmanship when operated in accordance with the manufacturer's operating instructions, for one (1) years from date of purchase, subject to the provisions contained herein. CWS warranty shall extend to the original purchaser only and shall be limited to factory repair or replacement of defective parts.

EXCLUSIONS

Certain parts are not manufactured by CWS (i.e., certain purchased options, etc.) and are therefore not covered by this warranty. These parts may be covered by warranties issued by their respective manufacturers and although CWS will not warrant these parts, CWS will act as agent for the administration of any such independent warranties during the term of this warranty. This warranty does not cover normal maintenance, damage resulting from improper use or repair, or abuse by the operator. Damage caused by lightning or other electrical discharge is specifically excluded. This warranty extends only to repair or replacement, and shall in no event extend to consequential damages. In the event of operator repair or replacement, this warranty shall cover neither the advisability of the repair undertaken, nor the sufficiency of the repair itself.

THIS DOCUMENT REFLECTS THE ENTIRE AND EXCLUSIVE UNDERSTANDING OF THE PARTIES, AND EXCEPT AS OTHERWISE PROVIDED HEREIN, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, PARTICULARLY THE WARRANTIES OF MERCHANT ABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Return for Repair Procedure

1. In the event of defects or damage to your unit, first call the Service Department Monday through Friday, 8:30 am to 4:00 pm PST, (503) 629-0887 to determine the advisability of factory repair. The Service Department will issue an RMA number (Return Merchandise Authorization) to help us identify the package when received. Please write that number on the outside of the box.
2. In the event factory service is required, return your Weather Station as follows:

   A. Packing

   - Wrap the Sensor Transmitter in a plastic bag first.
   - Pack in original shipping carton or a sturdy oversized carton.
   - Use plenty of packing material.

   B. Include:

   - A brief description of the problem with all known symptoms.
   - Your telephone number.
   - Your return street shipping address (UPS will not deliver to a P.O. box).
   - Write the RMA number on the outside of the box.

   C. Shipping

   - Send freight prepaid (UPS recommended).

- Insurance is recommended. (The factory can provide the current replacement value of the item being shipped for insurance purposes.)

D. Send to:

Columbia Weather Systems, Inc.
2240 NE Griffin Oaks Street, Suite 100
Hillsboro, Oregon 97124

E. C.O.D. shipments will not be accepted.

3. If your unit is under warranty, after repair or replacement has been completed, it will be returned by a carrier and method chosen by Columbia Weather, Inc. to any destination within the continental U.S.A. If you desire some other specific form of conveyance or if you are located beyond these borders, then you must bear the additional cost of return shipment.

4. If your unit is not under warranty, we will call you with an estimate of the charges. If approved, your repaired unit will be returned after all charges, including parts, labor and return shipping and handling, have been paid. If not approved, your unit will be returned as is via UPS COD for the amount of the UPS COD freight charges.

Columbia Weather Systems, Inc.
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